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AUTHOR Drewes, Donald W.; Bice, Garry R.
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ABSTRACT

In order to be maximally effective, an occupational information system (OIS) designed to support vocational education planning, administration, and client services should contain information dealing with energy, women in the work force, productivity, population demographics, equal opportunity, civil rights, coordination and linkage, new and changing occupations, resource limitations, and the world economy. Occupational information is needed to make decisions that are related to long-range planning, economic development, personnel development, curriculum development, facilities and equipment planning, program monitoring, evaluation and compliance, organizational development, policy and legislation formulation, budget justification, funding allocation decisions, and research and information development. Particularly needed are data pertaining to occupational demand, occupational supply, occupational characteristics, complimentary occupational information, and supply and demand analysis. Much of the information that is available in these areas is not, however, suitable for inclusion in an OIS. Often, existing data are incomplete, limited in scope, and inconsistently based on ambiguous criteria. In light of these informational needs, the National Occupational Information Coordinating Committee (NOICC) should take immediate action to establish the requirement definitions for an OIS that will be responsive to both the short- and long-range planning needs of national, state, and local vocational education agencies. (MN)

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OCCUPATIONAL INFORMATION AND VOCATIONAL EDUCATION: A CONCEPT PAPER

by

Donald W. Drewes
and
Garry R. Bice

Prepared for

North Carolina State Occupational Information Coordinating Committee

and

National Occupational and Information Coordinating Committee

Research Triangle Institute
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ABOUT NOICC

The National Occupational Information Coordinating Committee (NOICC) and its counterpart State Occupational Information Coordinating Committees (SOICCs) were created by the Education Amendments of 1976 (Public Law 94-482) with a mandate to:

- Development and implement a national, State and local occupational information system to meet the common occupational information needs of vocational education and employment and training program adminstrators and planners, and

- Improve coordination between, and communication among, such administrators and planners, as well as employment security agency administrators, research personnel and others.

The Comprehensive Employment and Training Act (CETA) Amendments of 1978 (Public Law 95-524) call for NOICC to:

- give special attention to the labor market information needs of youth.

The following officials are named in the 1976 law as members of NOICC:

- Commissioner of Education[1],

- Administrator of the National Center for Education Statistics,

- Assistant Secretary for Employment and Training, and

- Commissioner of Labor Statistics.

The members of each SOICC, also specified in the law, are representatives of:

- the State Board administering vocational education,

- the State employment security agency,

- the State employment and training council, and

- the State agency administering the vocational rehabilitation program.

1/ The function of the U.S. Office of Education was moved to the U.S. Department of Education subsequent to the 1976 law.

ACKNOWLEDGEMENTS

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The grant called for the accomplishment of four major tasks:

Task 1. Preparation of a national overview of the need for occupational information through a review of the literature, a summary of State needs assessment studies, interviews with Federal agency staff, and preparation of concept papers by recognized experts in the fields of vocational education, career counselling, CETA program planning, employment service operations and vocational rehabilitation. Reports from Task 1, including this report, are listed on p. iii.

Task 2. Development of an Occupational Information System (OIS) Handbook. This task has resulted in a three volume Handbook:

Volume 1. Occupational Information Development

Volume 2. Occupational Information Analysis, Presentation and Delivery

Volume 3. Technical Addendum

An OIS Handbook Executive Summary has been prepared as well.

Task 3. Development of training materials to accompany the OIS Handbook. The training materials include over 100 pieces of art work suitable for making overhead slides and a trainer's guide designed for use by Federal and State personnel to introduce audiences to the NOICC/SOICC network and the occupational information system.

Task 4. A training conference to introduce the OIS Handbook. Such a conference for States and territories in Federal regions 1-5 was held January 6-9, 1981, in Raleigh, North Carolina, and for those in Regions 6-10, January 27-30, 1981, in San Antonio, Texas. Participants in the conferences included representatives of the Federal and State agencies which are members of NOICC and SOICCs, and staff of the SOICCs.

Task 1 was carried out by Research Triangle Institute, Research Triangle Park, North Carolina. Dr. John E.S. Lawrence and Dr. Alvin M. Cruze served as project managers and authored some of the reports. Tasks 2 and 3 were performed by Program Resources, Incorporated, of Rockville, Maryland. David S. Lipstein, PRI Vice President, served as project director; Harvey Ollis was principal investigator. Task 4 was carried out jointly by RTI and PRI.

Joyce F. Kinnison, Director of the North Carolina SOICC, and Geroge E. Probst, Director of Research for the North Carolina SOICC, served as overall managers of the grant. Carol Kososki, Director of the South Carolina SOICC, and Warren W. Wolff, Director of the Colorado SOICC, provided valuable input and served as reviewers for the project.

Dixie Sommers of the NOICC staff was responsible for monitoring and overseeing the grant, under the supervision of Richard E. Dempsey. Russell B. Flanders, Executive Director of NOICC, provided general direction.

This report, one of the products of Task 1, discusses the use of occupational information in vocational education planning. It was prepared by Donald W. Drewes and Gary R. Bice of Conserva, Inc., of Raleigh, North Carolina, under contract to Research Triangle Institute. The opinions expressed are those of the authors and do not necessarily represent policy of NOICC or its member agencies.

Reports on the Need for Occupational Information

Concepts Papers

Occupational Information System and the Employment Security System: A Need and Resources Assessment, Charles E. O'Dell, 1980.

Occupational Information and Vocational Education: A Concept Paper, Donald W. Drewes and Gary R. Bice, 1980.

The Role of an Occupational Informatin System in Career Guidance and Counselling, Edwin L. Herr, 1980.

Occupational Information Needs for CETA Prime Sponsor Policy Making, Planning, and Program Operations, Andrew M. Sum and Paul E. Harrington, 1980.

Occupational Information System and Vocational Rehabilitation: A Concept Paper, Joseph B. Moriarty, 1981.

Literature Review

Data needs and uses of the Context of an Occupational Information System: A Review of the Literature, Nancy Paulson, 1980.

State Needs Assessment

Occupational Information Needs at the State Level: An Empirical Study of Data Needs Assessment Surveys, John E.S Lawrence and John Gross, 1980.

Federal Interviews

Occupational Information Needs at the Federal Level, John E.S. Lawrence and Alvin M. Cruze, 1981.

Final Report

Occupational Information Needs in Selected Public Agencies at the State and National Levels, John E.S. Lawrence, 1981.

Copies of Reports are available from NOICC
2100 M Street, N.W., Suite 714, Washington, D.C. 20037

PROLOGUE

The purpose of this paper is to examine the need for occupational information to support major vocational education administrative functions. Obviously, the ultimate purpose for all vocational education functions is impact on vocational instruction at the classroom level to benefit individuals. Although classroom instruction is the acknowledged primary educational activity, there are many supportive functions that must be accomplished to insure high quality, relevant, and efficient instruction.

This paper will define the major functions of vocational education administration; identify the data and information elements needed to effectively and efficiently perform those functions; suggest areas where specific types of data and information are weak, missing or insufficient; and recommend the role that an occupational information system might fulfill. In accomplishing the purpose of this paper, however, it is necessary to first identify some of the specific major challenges facing vocational education in the foreseeable future. The challenges identified are not speculative in nature but, rather, are those that directly are affecting our country in general and vocational education specifically. They are factors that must be considered in the future development of vocational education and for which data and information are of critical importance.

The paper further identifies a number of organizational and structural concerns that must be considered in the development of an occupational information system supportive of the functions of vocational education. To the traditional vocational educator, some of the system concerns may seem vague and superfluous. However, an occupational information system appropriately organized, capable of accepting appropriate inputs and yielding useable outputs, will help make vocational education a more effective, efficient, relevant and dynamic force for constructive change.

OVERVIEW OF CONTENTS

This paper is divided into five chapters. Chapter 1 identifies some of the major issues facing vocational education--issues that will shape the occupational information needed.

Chapter 2 provides a general description of vocational education planning, administration, and client services in terms of functions to be performed. The major functions are generally described in terms of the nature of the functions, who performs the functions, how the functions are performed, when the functions are performed and an overview of important decisions that are made during performance of the functions.

Chapter 3 delineates the occupational information requirements for carrying out the vocational education functions identified. Requirements are discussed in terms of occupational demand, occupational supply, occupational characteristics, complementary information, and supply/demand analysis.

Chapter 4 discusses the availability and suitability of occupational information in planning and administration of client services. Included in this discussion is an analysis of some of the limitations that restrict the utility of occupational planning information for vocational education purposes.

Chapter 5 suggests possible roles of an occupational information system in meeting the planning and operational information needs of vocational education. Included are recommendations feasible for current implementation as well as recommendations whose payoffs are more distant.

CHAPTER 1
INTRODUCTION

Any effort which purports to speak authoritatively to the needs of all vocational education for occupation information is both naive in its understanding and presumptious in its approach. Vocational education is not a monolithic entity with a well-defined set of needs. Rather it is a fluid confederation of programs, services and activities whose needs differ according to unique goals, philosophies, purposes and personnel.

Recognizing this diversity, we have chosen to approach the topic from the perspective of specifying the normative requirements of how an idealized occupational information system (OIS) should be structured and what it should contain in order to be maximally useful for vocational education purposes. These assessments are based on a personal interpretation of the major challenges facing vocational education in the next decade, the functions that vocational education can bring to bear in dealing with these challenges and the role of occupational information in the performance of these functions.

We have intentionally restricted our focus on the use of occupational information to support program planning and operations decisions conducted in an organizational setting. This is done for two reasons; first to distinguish organizational from individual needs for information, and second, to avoid duplication of effort with career information needs being prepared under separate authorship.

EMERGING CHALLENGES

Any discussion of the role of OIS in vocational education planning, administration, and client services must begin by clearly delineating the context within which vocational education must function, the mission of vocational education and the societal issues that impact or will impact on vocational education. The context is all pervasive inclusive of demographics, exiting efforts and programs, technology and political scenarios. The role of vocational education, although debatable and broadly interpreted, is basically defined in legislation. To be helpful for planning and to provide direction for the future, some analysis of societal needs and directions must be considered.

Energy

The energy crisis in America has been building for a number of years. Among others, educators have not considered the ultimate impact that the energy crisis has and will have on our society and specifically on the jobs and occupations in society. Two primary areas should be of concern. First is transportation. The lack of energy (particularly petroleum) to move people to work on a daily basis, the transportation of goods raised or produced, the spatial disbursement of jobs, all will provide a vastly different setting for future jobs. Changes in sources of energy for transportation will have an impact on the types (and technology) of vehicles produced, which, in turn, impacts on many different job areas. Second, those goods and products that utilize petroleum-based derivatives in their production will likely be replaced with newer types of products that require new job skills for their production. In order to play a key role in effective planning for the delivery of services to clients through vocational education, an occupational information system must be capable of reflecting these trends so as to clarify their implications for vocational education.

Women in the Work Force

Social factors have been set in motion that will continue to alter the composition of the work force. The move to eliminate sex-role stereotyping in educational training programs, affirmative action programs of employers, changes in the family structure, a continued press for equal rights--all have impacted and will continue to impact the work force participation of females. To address these changes, an OIS should be sensitive to the work force composition and the impact induced by types of programs offered, recruitment and selection procedures, curriculum development, job restructuring, preparation of instructional, administrative and supervisory staff, and other areas.

The impact of increasing female participation in the work force has implications for competition for scare jobs and, hence, for job preparation, as well as the creation of new jobs related to child care and personal services. The economic need for both adult family members to work also has implications for upward job mobility and has considerable impact on the need to know more about sex-related differences in job satisfaction.

Productivity

Many argue that one of the greatest causes of inflation is decreased productivity. Work force participation rates, job specific skills, job satisfaction, work habits and attitudes as factors of occupational information all serve to influence productivity. Vocational education has a major role to play in increasing productivity, and it must do so through effective and efficient planning and program development based upon sound occupational information.

With productivity becoming a major factor in our society, more precise and relevant occupational information will be necessary. Occupational information will be needed to promote and support curriculum revision, updating of existing instructional strategies, formulation of new and improved delivery modes, alteration of existing programs, design of innovative work experience, optimum resource allocations and policy development if vocational education is to contribute to increased work force productivity.

Population Demographics

Population demographics pose one of the major problems in vocational education planning. The problem arises primarily because of the lack of consideration of demographics in the planning process rather than the lack of demographic information. Agencies such as employment security, the Census Bureau, and economic and community development all collect and analyze various demographic information. Yet, there remains limited use of demographic information in vocational education planning. Some of the reasons relate to the accessibility of the information, the lack of knowledge on how to use the information in planning processes, the uncertainties as to the effect of demographics on numbers and locations of jobs, and the lack of information regarding future impact on job structures, productivity, and mobility.

Population changes and their effect on vocational education functions are already profound. With the passing of the post-war baby boom and the aging of the war-baby population, the influence on the work force, energy use, and productivity is already evident. Migration of business and industry to the sunbelt area is an example of changes that should be taken into account in vocational education planning. Changes in the concentration of persons with occupational skills and the locations of job opportunities are critical factors.

Aging of the population not only affects the types of skills and training needed for upgrading or retraining but also the types of goods and services and hence the type of jobs that will be required by our society.

Equal Opportunity

Legislative and moral commitments to equal access and opportunity and the historic disparity in the enrollment of native Americans, blacks, Hispanics and Southeast Asians has increased the pressure on effective vocational education planning. Not only is it of critical importance to identify and locate these minority individuals, but also to provide them with equal access to job preparation programs which prepare them to successfully compete for existing as well as new and emerging job opportunities.

Characteristics of jobs must be identified, catalogued and structured into appropriate educational and training programs. Provision must be made for support services, whether they relate to special skills development, guidance and counseling services or family and social needs. Programs must be offered in an environment that affords the most conducive learning opportunities.

Civil Rights

Individual civil rights, particularly those for the handicapped, suggest another area where occupational information is important. Information about types and frequencies of handicapping conditions along with physical, social and psychological barriers that prevent equal access to career opportunities must be considered. Subsequently, information must be used in program and curriculum development, delivery system strategies, and policy and legislation formulation.

Coordination and Linkage

Increasing competition for dwindling resources, changing age structure of the population, greater concerns for instructional productivity, and concerns about the ability of current educational delivery systems to do an effective job demand greater coordination and linkage of current and projected manpower delivery systems. Duplication of the same or similar curricula, oversupply of trained personnel in selected fields, and lack of preparation of individuals for new and emerging occupations evidence the need for more and better occupational information.

Improved coordination among delivery systems at the same level (i.e., among local schools) and between levels (i.e., articulation of secondary and postsecondary) is being demanded. Occupational information, particularly that related to supply and demand, is of critical importance. Decisionmakers must determine the efficacy of providing certain types of programs. For example, decisions must be made relative to the economic benefits of offering various job-specific programs to prepare individuals for relatively low paying jobs. Further, if coordination and linkage are not considered, who must accept the responsibility of oversupplying trained personnel for certain jobs and undersupplying trained personnel for others?

Coordination and linkage certainly are not ends unto themselves and must be accomplished in the proper perspective of all the functions of vocational education, as will be discussed later in this paper.

New and Changing Occupations

In order to prepare individuals to successfully compete for jobs in a dynamic society, adequate and accurate information must be available about new and changing occupations. To meet the needs of individuals as well as those of business and industry, it is important to know the competencies required so as to ensure that job skills are relevant to match those required by the job market.

During times of rapidly changing technology when existing jobs and competencies are becoming obsolete rather rapidly, it is important to have an occupational information system that can readily identify emerging job needs. An occupational information system that is effective in this area will help improve worker productivity and will promote economic development. Further, new and changing occupations must be identified early enough to allow for organizational, curriculum, and personnel development efforts needed to support the programs to serve business and industry requirements.

Resource Limitations

Americans are generally unaccustomed to working under conditions of severe resource limitations such as time, human resources and fiscal resources. The future is not likely to allow us the luxury of using resources at current levels to train our work force. In fact, there will likely be pressure to reduce the amount of time required to prepare individuals to enter the labor market. Concerns over inefficiencies resulting from the misguided training of

individuals and/or preparation of individuals for jobs that no longer exist will make the need for an occupational information system more pronounced as resources continue to shrink.

World Economy

The world economy will have a major influence on vocational education and the need for a responsive occupational information system. It is a generally accepted fact that for each one billion dollar trade deficit, there is a loss of approximately 40,000 jobs in the U.S. An occupational information system is needed to identify the nature, extent and locations of jobs vulnerable to changing world markets. Further, even in a time of rapid inflation, there are major job opportunities, many of which are a function of comparative inflation rates. For example, when other countries have an inflation rate greater that that of the U.S., a considerable number of foreign businesses and industries locate facilities in this country, thereby creating more jobs. Currently, that situation is prevalent and will likely remain so for some time because of U.S. efforts to reduce inflation and because of the growth of the Third World nations.

CHAPTER 2

FUNCTIONAL DESCRIPTION OF VOCATIONAL EDUCATION PLANNING, ADMINISTRATION, AND CLIENT SERVICES

The overall purpose of this chapter is to describe the generally accepted functions served by state level vocational agencies. In addition, the chapter includes a discussion of who performs the functions, how the functions are performed, approximate schedules of when the functions are performed, the supportive role of an OIS in the performance of the functions, and what agencies make the decisions.

FUNCTIONS

The functions that must be completed to carry out the vocational education program in the United States are visible from the Federal level down through the state and local levels where most of the operational programs exist. Although the same or similar functions exist, the magnitude and impact across other governmental responsibilities may vary, and, indeed, may not even exist at some levels of government. For example, the development of skilled manpower and its relationship to planning for national defense and security is of foremost concern at the Federal level, but plays almost no role in planning at the local level.

The Federal government has assumed a directive role in vocational education since the advent of the Smith-Hughes Act which inaugurated Federal assistance to education. This role has led to the evolution of a Federal-state-local partnership that has shaped the current structure of vocational education. This Federal-state-local partnership has resulted in a program of vocational education that although operational at state and local levels is driven by Federal priorities. Information collected at the local level and aggregated at the state level is transmitted to the Federal level in compliance with legislative mandates. In order to permit states to develop programs of vocational education to serve their unique needs and to prohibit undue Federal interference with state programs, the Federal role has tended to focus upon provision of Federal assistance with direction provided by categorical funding and prescriptive use of Federal funds. Through matching and maintenance of efforts, the Federal presence has exerted a significant multiplier effect on state and local funding and on the content of programs offered.

The bottom line, then, is that Federal priorities embodied in the regulated use of Federal funds provide the directive context for state and local level agencies in carrying out their functions. This is not to suggest that the Federal functions are more or less important, but rather to emphasize that the purposes of the functions differ.

The functions performed in the administration of vocational education vary widely from state to state. One can comprehend the diversity of functional form and structure by simply observing the wide variety and quality of vocational programs across the country. Generally accepted functions of educational administration are planning, directing, organizing and controlling. When one limits the administrative functions to those four areas, it is often easy to overlook the specific and detailed operations that are required to provide for effective and efficient vocational educational programs. Therefore, this chapter will set aside the four generic functions and discuss a more specific set of functions in greater detail. The reader should note that the following functions are discussed in random order, with no intent of determining their relative value or priority.

Long-Range Planning

One of the most obvious functions performed by state level administrators is that of long-range planning. In addition to the legal requirements of developing annual and five-year plans, long-range planning is needed to provide overall direction to the statewide vocational education program, provide information to policymakers relevant to the degree to which needs of citizens are or are not being met, improve the economic and social well-being of the state's population, and provide guidance to local educational agencies for the development of local programs. Further, long-range planning in vocational education assists other agencies at the state level in the coordination and articulation of programs and services and provides legislators and others with information that affects the whole organization and operation of state government.

Economic Development

It should come as no surprise to anyone, that one of the functions of vocational education is that of economic development. One of the major claims of vocational education in recent years has been the premise that vocational

education contributes to and indeed is often a major factor in the economic development of a state. A number of states have established coordinating mechanisms and operating programs that effectively tie vocational education and economic development together. In this functional area, vocational education often plays a major role in providing training to clients in locations that will attract and retain new and/or expanded business and industry.

The function is related to planning, but often should be considered as a separate entity, primarily because it is more closely tied to the concept of a "means" rather than an "end." Whereas the planning function provides for economic development, the economic development function is action oriented and results from an application of planning.

Personnel Development

A third function of vocational education is that of personnel development. Although states provide for personnel development in a variety of ways, these ways are all designed to contribute to the long-range effectiveness of vocational education. The quality and quantity of instructional, supervisory and administrative staff has a major impact on the quality and quantity of vocational program offerings. To supply an adequate number of qualified staff, the personnel development function must be well organized and implemented. In order to insure staff with current and relevant qualifications, both preservice and inservice programs must be available to provide for adequately trained personnel.

Curriculum Development

One of the most potent criticisms of vocational education today is that much of the curriculum in vocational education is out-dated or does not meet the needs of the labor market. The fear of a "national curriculum" has often been used as justification for the lack of a strong national emphasis in this area. On the other hand, states have not always had the resources needed to provide the relevant and timely curriculum needed to meet labor market requirements. Further, the curriculum development process is usually time consuming and expensive, and more often than not is based upon existing need to the exclusion of concerns for new and emerging occupational requirements. Further, new curricula often call for new or different facilities and equipment and different instructional capabilities of staff. Those states that have not

provided adequately for the curriculum development function often must suffer the consequences in terms of lost opportunities for student enrollments and job placements, statewide economic development and other potential benefits.

Facilities and Equipment Planning

One of the major reasons that vocational education is a "high cost" program is the tremendous investment that must be made in facilities and equipment. The fact is, however, that it does little good to train individuals on equipment that is obsolete and no longer used in business and industry. Most local school systems are not able to afford the costs of maintaining equipment that is used in many businesses and industries. In addition, the problem is compounded by the fact that there is a need to train individuals for new and emerging occupations, for which facilities and equipment requirements may not be known. On the other hand, unless the facilities and equipment planning function is provided for, curriculum content and relevancy will suffer.

Program Monitoring, Evaluation and Compliance

Although the program monitoring, evaluation, and compliance function is often considered to be part of the planning function, it is a function that must be objective and free of outside influences. In turn, this function must feed results directly back to planning for a number of reasons. The monitoring component's purpose is to determine what is being done. The evaluation component is used to determine the degree to which planned objectives are being accomplished and the impact the accomplishments have on those served. The compliance component determines whether or not legally mandated requirements are being satisfied.

This function as well as individual components thereof can be accomplished in a variety of ways. Some states delegate the total responsibility for monitoring, evaluation and compliance to the local systems. Others use self-evaluation or checklist procedures which may be aggregated at the state level. Some states utilize state staff with pre-established criteria or standards and make onsite visits to fulfill this function. Still others use a combination of approaches. In any event, there is a need for a wide variety of information aggregated at the state and national levels.

Organizational Development

Many states totally neglect or fail to perform the organizational development function. Organizational development requires that staff constantly

renew and update their knowledge with respect to the programs and activities that are being offered at the local level. Like other functions, much information is needed and should be used to support the planning function. It is impossible, for example, for the state to plan, organize, direct and control the development of a relevant statewide program of vocational education if its own staff members are unfamiliar with or unaware of current, relevant, high quality programs. The organizational development function is one in which the organization, be it state or local, constantly prepares its staff to gather, analyze, and interpret information about what is happening, compare what is happending to what should be happening in terms of societal and technological trends, and translate discrepancies into plans and programs for implementation.

Policy or Legislation Formulation

As the state-of-the art develops and individual and societal needs change, it is often necessary to revise rules, regulations and operating procedures to meet evolving societal and individual needs. Often, the rules, regulations and operating procedures are set forth in legislation and/or policy interpretations which restrict opportunities for change and/or modification. State staff must have information about what is and what is not happening and reasons why certain events are occurring. With appropriate information, state staff are better able to formulate policy and legislative recommendations that will enhance the chance of success of program offerings. Further, policy and legislative formulation affects all the other functions discussed in this section.

Budget Justification/Funding Allocation

Closely related functions are those of budget justification and funding allocation. These functions divide allocated fiscal resources among a number of programs, services and activities and produce a justification for that allocation. Decisions must be made as to whether the return on investments will be greater in the area of curriculum development, facilities and equipment, personnel development, evaluation, or other areas. A wide variety of information is needed to effect wise funding allocation decisions and to present a reasoned justification thereof.

Research and Information Development

The research and information development function is designed to provide information to reduce decision uncertainties. Information is needed to:

specify the need, define programmatic options, and evaluate those options to make an informed choice. Without an adequate research and information function, vocational decisionmakers are deprived of an intelligent understanding of the external conditions and the quality of these decisions can be expected to suffer.

FUNCTIONAL RESPONSIBILITY

To some degree, all functions discussed in the first section are performed at the local, regional, state and national levels. However, the degree to which the function is performed and the sophistication of its performance varies considerably. In addition, the organization and operation of vocational education varies so widely from state to state that it is difficult to describe who performs the functions, without doing so on a state-by-state basis. However, keeping in mind that there are variations from state to state, an attempt will be made to present a general idea of those generally responsible for performing the more common functions.

Long-Range Planning

As indicated earlier, long-range planning might be considered an all-inclusive function that encompasses all the functions previously described. The problem is that many of the other functions run the risk of becoming obscure and consequently neglected if they are not specifically identified and addressed. In addition, long-range planning at the national and state levels takes on a different perspective than does planning at the regional and local level. Further, the amount of resources (both human and fiscal) devoted to long-range planning varies from level to level. At the national level, specific long-range planning has been the responsibility of a planning unit within the Bureau of Occupational and Adult Education. Although operating with limited staff and resources the unit develops general directions for the nationwide vocational education program. More realistically, however, long-range planning at the national level is accomplished by Congress, OMB and the President's Domestic Policy staff.

At the state level, long-range planning is usually the responsiblity of a unit under the direction of the state director of vocational education (although organizational structures vary from one state to another). It should be noted at this juncture, that some of the postsecondary components of vocational-technical education do not always fall under the rubric of the division of

vocational education, but rather under a separate board or agency, usually under the higher education agency. Although a single five-year plan is submitted from a state for Federal-level support of vocational technical education, there often is little coordination and articulation between the secondary and postsecondary components of the plan. By law, state advisory councils on vocational education and CETA agencies have joint input to the planning process at the state level.

At the local level, long-range planning, if any, is the responsibility of a local director of vocational education or the superintendent's office. Some large metropolitan school systems have separate planning units to carry out this function. In actuality, most of the long-range planning at the local level is done by the local boards of education and is reflected in their budgets in terms of commitments to staffing, facilities, etc. Some local systems also utilize outside consultants or agencies to periodically assess programs and develop recommendations for long-range planning purposes.

Economic Development

The economic development function for vocational education follows much the same pattern as that of long-range planning. The major difference is that the economic development function is more a resultant activity of vocational education planning and implementation. There are no staff assigned this responsibility other than those staff involved with planning, and the economic development function is more a direct concern at the national and state levels. On the other hand, some states have organized units such as those in Tennessee and South Carolina that work with economic and/or industrial development units at the state level. Their function is assisting to attract business and industry to the state.

Personnel Development

The personnel development function is accomplished with the joint cooperation of several agencies. The planning for the function is usually the result of efforts in the national and state agencies with input from teacher training institutions. Usually formal training programs are supported by Federal and state funds with much input from colleges and universities. Special programs may be funded at the national level to encourage change or to develop new strategies. Further, development of new curricula for special types of personnel needs (such as curriculum specialists) may be wholly sup-

ported at the national level. The function itself, however, is most often carried out by colleges and universities. Some programs have been developed that utilize business and industry as locations for some training and retraining. The personnel development function at the local level is usually limited to the provisions of sabbatical leaves (usually in larger systems) and a number of days of inservice training during the school year.

Curriculum Development

This function is supported, financially, at the national level by providing for six regional curriculum management centers and the support of curriculum development projects conducted by universities, private agencies or state or local agencies. Most states have curriculum development centers or belong to consortia such as I.D.E.C.C., V-TECS, the Mid-America Consortium or others. Some states participate in several programs as well as supporting their own units. In addition, some states develop agreements with colleges and/or universities for curriculum development. Local level curriculum development is usually a function of the individual teacher's efforts although some larger systems have curriculum development centers. Learning and resource centers in local systems are other methods of facilitating the curriculum development process although they tend to focus on instructional materials development rather than curriculum development.

Facilities and Equipment Planning

Because facilities and equipment are process-related functions, little if any of that function is performed at the national level. There are two exceptions, however. First, there is a facilities planning function in the U.S. Office of Education that provides some technical assistance and clearinghouse types of activities. Second, some studies are conducted that relate to general designs and materials specifications. One need only be reminded of the recent controversy related to the use of asbestos in school construction to get an idea of this type of involvement. Most of the facilities and equipment function is accomplished at the state level, since in most states the largest share of those costs are supported by state funds. (It might be noted that permissive legislation at the national level allows states to expend certain Federal funds for facilities and equipment.) Most state education agencies maintain a facilities planning unit that establishes minimum specifications for space and construction materials. In addition, some states have established facilities

and equipment lists for various courses of studies. Obviously, OSHA rules and regulations are important factors in this area also. Further, because of the financial support from the state level, many states maintain facilities and equipment inventories, since that is needed in the budget planning function.

Program Monitoring, Evaluation and Compliance

This function is carried on at all levels, as it is the key ingredient in all planning, budgeting, policy formulation and other areas. The degree and type of monitoring, evaluation, and compliance varies with the level. For example, Federal level agencies need outputs from this function for planning (all areas), budget justifications, and policy formulation. Compliance (a form of evaluation) is a national concern in order to determine if the intent of Federal legislation is being fulfilled. States are concerned with compliance primarily because of the Federal interest while local level agencies are usually disinterested in activities for compliance purposes. However, evaluation of programs is a major interest of state and local agencies primarily because of the need to expand and improve programs. At the national level, the National Advisory Council on Vocational Education is charged with evaluation of vocational education, but because of the magnitude of the assignment must use secondary data sources as a basis. State advisory councils on vocational education, which often provide information to the National Advisory Council, frequently conduct public hearings and occasionally conduct local evaluations.

Organizational Development

One of the most often overlooked functions is that of organizational development. At the national level, funds have been provided (at least there is permissive legislation) to allow opportunities for organizational development. At the national level itself, interagency personnel exchange programs are aimed at organizational development. The former Education Professions Development Act (not a basic part of the State Plan known as Personnel Development) encouraged organizational development at the state, university, and local levels. Basically, each agency is responsible for organizational development, with some resources provided for this purpose. Sabbaticals and inservice training are the common delivery systems used at the local levels.

Policy and Legislation Formulation

By definition, this function is performed at the state and national levels. Policies for implementing legislation are most often developed by

administrative staffs whereas legislation itself is most often developed by state and Federal legislators. Local policy is developed by boards of trustees (postsecondary level) or local boards of education upon the recommendation of the superintendent (or chief executive officer) and local directors of vocational education.

It might be noted that legislation at the state and Federal level is often influenced by lobbyists, pressure groups or other grassroots efforts.

Budget Justification

As a general rule, the ultimate responsibility for budget justifications rests with the chief executive officer at the level being considered. Often, the chief executive officer is provided support by the person responsible for the administration of the vocational technical education program. For example, the local director and the superintendent justify the budget at the local level. At the postsecondary level the school director or the dean of technology (or other titled person) assist the institution's president (or director). At the state level, the state director of vocational education assists the state superintendent or commissioner--except that in some states with separate state boards the responsibility rests solely with the state director. Currently at the national level, the Deputy Commissioner of the Bureau of Occupational and Adult Education assists the U.S. Commissioner of Education and/or the Assistant Secretary for Education.

Funding Allocation Decisions

In some cases, funding allocation decisions are established by policy and/or legislation. Examples of this are found in PL 94-482, the Education Amendments of 1976, where set-asides are enumerated for Vocational Education. In addition, more specific allocation decisions are made by administrative and legislative structures at the state and national levels, particularly when annual or biennial budgets are approved. At the national level, the Office of Management and Budget has an influence on allocation decisions. At the state level, units similar to the OMB but often called Administrative Services (or other names), have similar influences. There is little flexibility for allocation decisions at the local level, except in the larger school districts where those decisions are usually made by the local director.

Research and Information Development

Because of the heavy demand on resources, research and information development is usually a function of state agencies, colleges and universities, and private organizations. On occasion, some of the large local education agencies devote some resources to research and information development. These functions, in many situations, are completed by those who have some formal training in the general areas of social research. Federal legislation does require evaluation and followup studies at the local level. In addition, local plans are to be developed based upon an analysis of local labor market needs. Based upon those requirements, much research and information--often of an informal nature--is generated at the local level, some by researchers, some by guidance and counseling personnel, and some by administrators.

HOW FUNCTIONS ARE PERFORMED

The functions of vocational education, as in other areas, are either performed internal to the organizational structure of the delivery system, or externally to it. Whether or not a function is performed internally or externally is usually dependent upon two factors--the availability of resources, both financial and human, and the philosophy and policy of the delivery agency. For example, some agencies have chosen to have research and information development performed mostly external to the agency (although the agency may provide coordination and financial support) while the function of policy and legislative development is usually performed internally.

Internal

When an agency performs the function internally, it usually does so through the establishment of committees or task forces, individual staff assignments (which usually means work overload for staff), or through the establishment of special units or sections within the agency. The primary reason for this is that most administrative units in vocational education have been established to supervise and/or monitor the actual delivery of services in the classroom--or, more exactly, the teaching of job skills to students. When resources are devoted to other functions, it obviously decreases the resources available for classroom instructional use. Honest philosophical differences among educators at the same level and between levels (local secondary, postsecondary, state, and national) account for many differences among states. For example, there are those who feel that all Federal funds for

vocational education should be distributed to local systems on a formula or other basis while others feel that Federal funds should be used to provide incentives to develop new and expanding areas or should be used primarily for research and development purposes.

External

When the functions of vocational education are performed by external agents, they are most often completed by those in colleges and universities, public or private organizations or agencies, advisory committees, individual consultants, or other agencies. This is accomplished administratively through use of a contact or grant, which might shed some light on the context of how some functions are performed. The relationships between the vocational education agency vary widely. The variances may be the result of personal and professional relationships, biases or specific interests, business or professional interests, peer pressures, opportunism or other reasons.

It should be noted that those vocational education agencies that are known for their quality programs are those that utilize a combination of internal and external agents to complete necessary functions. Further, it should be noted that both primary and secondary data sources are used to fulfill the needed functions. The resources available to those performing the function will often determine the source of the data.

SCHEDULE FOR PERFORMANCE OF FUNCTIONS

Although individual students--the ultimate beneficiaries of all the functions of vocational education--may enter and/or exit vocational instruction programs at specific points in time, all the functions of vocational education are continuous. There are report and plan due dates that suggest specific times at which written reports and plans are due, but to accomplish a "single round" of the functions often takes over a full year. For example, it is not uncommon for the planning for "next year's plan" to be well along before this year's plan is due. Some of the functions run in 18- or 24-month cycles (depending upon state and agency level) while others are continuous processes and seem never to end.

On the other hand some functions must observe relatively strict time schedules. For example, specific due dates are published for annual and long-range plans, specific due dates must be observed for budget justifications, and specific time lines are needed when functioning in the area of legislation development.

NEED FOR OCCUPATIONAL INFORMATION

Since effective and efficient vocational education programs offered to individuals must be timely and relevant, all decisions must be based upon timely occupational information. The degree of specificity of the information may vary from function to function or from level (local school) to level (state), but occupational information is needed at all levels for all functions. It is acknowledged, however, that other types of information (political, social, etc.) may also play a role in the decisionmaking processes.

Occupational information is needed to make decisions that are related to long-range planning, economic development, personnel development, curriculum development, facilities and equipment planning, program monitoring, evaluation and compliance, organizational development, policy and legislation formulation, budget justification, funding allocation decisions, and research and information development. The aggregation of the information may vary from one function to another, and in some situations trend information is needed, but whatever the function occupational information is needed in all cases.

CHAPTER 3
OCCUPATIONAL INFORMATION REQUIREMENTS

The purpose of this chapter is to discuss vocational education requirements for occupational data. Data requirements will be discussed in terms of five major classification categories: occupational demand, occupational supply, occupational characteristics, complementary occupational information and supply/demand analysis. Each data category will be discussed with reference to the definition of that category, major data elements comprising that category, the uses for these data elements in vocational education, the occupational detail in which they should be presented, the geographic specificity in which they should be detailed, the format that would make them most useful, the frequency in which they should be presented and the timeframe for projection, if applicable.

OCCUPATIONAL DEMAND

Definition

Occupational demand can be viewed either as a quantity of labor desired at a specific time and at a specific price or as an amount of human resource needed. Under the former definition, demand at a specific time is described by a schedule showing the amount of labor buyers are willing to purchase at different prices. Under the latter definition, demand is defined as the change required to make current employment levels congruent with a desired employment goal. In this context, demand is defined as a single number rather than a schedule showing quantities desired under various price levels.

Vocational education has historically accepted the needs approach to the definition of demand. Perhaps this is because they can easily relate demand to the concept of need and its consequent measurement as a discrepancy between what is presently (current employment level) and what should be (stated employment goal).

The concept of demand as a discrepancy between a current and a desired future employment level contains certain subtleties that need to be explored. As is well known, contributions to demands so defined come from two sources--replacements and growth. Replacement stems from the necessity to replenish the work force due to attrition. Thus, just to keep the work force constant would require an influx of human resources. The amount of human resources

required to reach the future employment goal beyond that due to replacement is defined as resulting from growth. Hence, demand is comprised of both replacement and growth.

In the context of an individual firm, occupational demand translates operationally into the notion of a position vacancy. A vacancy means that an employer has a need to add a person unit to the stock of labor currently performing a specific occupation. An addition to the stock of labor can be accomplished in one of two ways--either the employer can hire from outside the firm or promote from within the firm. If the employer hires from outside, the position becomes a portal into the firm--a doorway through which people from the outside can enter the organization. In the event that the position is filled by hiring from within, the position is closed to outside entry. All internal promotions, assuming that the total work force is not reduced and/or that job contents are not restructured, creates a chain reaction eventually resulting in filling a replacement through outside hiring. However, the "portal of entry" created by the original need may be at a considerably lower level in the organization than the original position filled.

Vocational education as a developer of job skills prepares people for entry level employment and for upgrading their job skills and abilities. With the exception of those cases in which vocational education trains those already employed for promotion within their firm, vocational education's largest clientele is for entry level preparation. Thus, vocational education's main concern with occupational demand is as it directly translates into the number of vacancies. Vacancies is a key concept because it is only through the avenue of hires into entry jobs that the vast majority of vocational education students gain access to jobs in which they can utilize their acquired skills and training.

Prediction of occupational demand poses a conceptual choice regarding methodology. One approach is to estimate the number of vacancies actually anticipated by individual employers. The number of expected vacancies for a specific occupation aggregated over all employers in a given labor market provides an intuitively direct estimate of projected occupational demand. An alternative approach is to define a desired level of goods and services for a specific labor market and then to derive through econometric models the specific occupational employment requirements necessary to achieve that desired level.

These two approaches are a study in polar opposites. Predicted demand defined as the collectivity of vacancies anticipated by individual employers is a 'bottoms-up' decentralized approach in contrast with the centralized 'top-down' allocative planning inherent in the employment requirements methodology. Anticipated vacancies is conceptually direct and intuitively understood whereas employment requirements are derived from obtuse economic models not easily understood by lay users. One approach depends upon the collective judgments of employers, the other on the statistical acumen of economists.

Specific Data Elements

The concept of occupational demand is most meaningfully measured by the following data elements:

1. number of vacancies classified by occupation, and
2. number of hires anticipated over a designated time period classified by occupation.

In this context, vacancy is defined as a job position resulting from either replacement or growth for which an organization is currently seeking to hire. The number of hires anticipated over a designated time period is a prediction of the number required to be hired in a specified occupation in order to achieve a designated employment goal.

The requirements approach to demand prediction is selected for the following reasons. Basing demand projections on employer estimates is subject to several major validity threats. Employers may not be able or willing to provide valid estimates of future employment needs. Employers, especially the smaller businesses, do not have well-developed long-range personnel planning capabilities, preferring instead to adjust their hiring requirements incrementally to meet more immediate market demand. Estimates are often based on nonstandardized, intuitive procedures that are nonreplicable.

In contrast, the requirements approach utilizes a standardized, albeit not easily understood, prediction methodology. This insures that estimates from all labor markets are based on the same procedures and are thus directly comparable. Other considerations being equal, an objective approach is generally more preferable as a basis for administrative decisionmaking.

Data Uses

Vacancies as a measure of currently available job slots and numbers of hires anticipated in the future has a direct meaning for vocational education. They represent an indication of the labor market's capabilities to absorb additional new entrants. If there are few vacancies and a limited number of hires anticipated in the near future, vocational education can anticipate a difficult time placing its graduates in this occupation or occupations with similar demand projections. Conversely, those occupations showing a significant number of vacancies and with a continuing trend into the future indicate those occupations for which vocational education should consider focusing its programs that prepare for entry level employment.

Number of hires anticipated in the future as a measure of occupational demand is a key ingredient in planning decisions. With the possible exception of monitoring, evaluation and compliance, all functions delineated in chapter 2 are impacted by the number of anticipated hires as an indicator of the need for vocational education programs services and activities.

The importance of job vacancies is confirmed by two separate statewide surveys of occupational information needs--one conducted by the Oregon SOICC, the other by North Carolina SOICC. In the North Carolina study, job vacancy was the highest ranked category of labor market information according to user reports. The relative importance tended to be confirmed by the Oregon results which showed information on job openings to be the third most needed data element when ranked according to the percentage of respondents indicating a need for the element.

Number of vacancies as an operational measure of demand is not consistent with current Department of Labor usage. Vacancies are considered an inappropriate measure of demand because they include 'turnover' and thus provide an inflated estimate of the number of jobs available.

The notion that turnover should be excluded from estimates of occupational demand and, thus, from planning consideration is subject to debate. One could argue that benefits accure, especially for youth entering the job market for the first time, from being employed even if the person is in a high turnover job. The employment experience may provide an opportunity to learn employability skills first hand in a job setting and to test occupational aspirations against job realities. Or, an entry job may be simply a 'gate' through which

the inexperienced must enter, gain experience, and move on either to jobs within the same firm or to other firms with similar jobs. To deny vocation education planners occupational information because it is influenced by turnover runs the risk of curtailing their efficiency, preempting their prerogatives and distating their philosophy.

Occupational Detail

The level of desired occupational detail is a matter of balance between excessive fractionation of occupational detail and insufficient information provided by excessively global occupational categories. The Dictionary of Occupational Titles (DOT) with over 20,000 occupational entries is too voluminous to constitute a useable occupational classification scheme. On the other hand, the currently used census categories containing some 440 occupations is frequently at too gross an occupational level to support vocational education program planning.

Although no classification will ever be ideal for all purposes, the Standard Occupational Classification (SOC) of the Office of Federal Statistical Policy and Standards, U.S. Department of Commerce appears to be a viable choice. This classification system contains some 660 occupations classified according to a four-level hierarchical system where each level represents groupings in successively finer levels of occupational detail. The SOC is compatible with DOT with cross-references developed that permit users to link DOT occupational classifications with SOC codes.

Standard Occupational Classification is recommended for the following reasons:

- SOC has the potential of becoming a universally accepted standard for occupational classification equivalent in acceptability to the Standard Industrial Classification currently used;
- The SOC is or can easily be made compatible with other occupational classification systems by appropriate cross referencing;
- Occupations are grouped according to similarities of work performed;
- The four-level organizational structure permits a variety of choice in the level of occupational aggregation desired.

Geographic Detail

Geographic detail should correspond to the concept of local labor markets. A local labor market is defined conceptually as that area in which a worker can seek employment without the necessity of changing place of residence. Operationally, labor markets as defined by the Department of Labor include a central city (cities) and surrounding metropolitan areas which may include one or more entire counties. In recognition that the balance of state (those areas not encompassed in a labor market area) does not conceptually constitute a labor market, the balance of state should be divided into sub-state areas and occupational demand data presented for each of these areas. Planning or administrative districts established in the states for planning/budgeting purposes constitute a readily available definition of sub-state areas.

Format

The format should be in tabular presentation. Separate tables should be presented for statewide totals for each labor market area within the state and for each substate area comprising the balance of state. Each table should present information on number of vacancies by occupational classification for the previous 30 days, average number of monthly vacancies for the past 12 months, projected number of anticipated hires for the forthcoming 12 months and average number of anticipated hires for a five-year period. In addition, a variety of graphical methods should be used to avert an over-dependency on tabular presentations.

Frequency

Job vacancy data change rapidly. In order to present an accurate picture, vacancy data should be updated weekly or biweekly. Information on anticipated hires over the next year and average annual hires over a five-year period should be updated biannually or at least annually.

Projected Time-Frame

As indicated, new hires should be projected on a one- and five-year basis. This timeframe corresponds to vocational education's needs to plan on a five-year cycle and to submit one year annual planning updates. Updating the five-year estimates annually provides vocational education the capabilities to assess the changes anticipated and to alter five-year projections of employment demand.

OCCUPATIONAL SUPPLY

Definition

Supply, as generally interpreted by vocational planners, refers to a pool of persons available and suitable for employment in specific occupations. The requirements in the definition that persons be both available and suitable in order to qualify as a supply for a specific occupation imposes specific constraints. The condition of availability requires that a person must be actively seeking employment in order to qualify as a bonafide supply. Translated into labor economist terms, a person must be in the labor force in order to contribute to the supply of labor. This means that those who have stopped actively seeking work because they become discouraged about the possibility of finding employment, because they became temporarily ill or, for a number of other reasons withdrew from the labor force, should not be included as a potential supply.

Consideration of supply as a pool of those available for work is at variance with current National Occupational Information Coordinating Committee (NOICC) definitional standards. According to NOICC usage, supply includes those available for work as well as all those already employed. Since those employed are also included in NOICC's definition of demand, the effect of adding currently employed is viewed by NOICC as canceling in the arithmetic. Unfortunately, the problem may not be readily resolved by arithmetic. Supply carries the connotation of a source of developed but uncommitted resources that stand ready for use. Short supply is generally interpreted to mean that the market is demanding more resources than are immediately available. Supply and demand used in this manner tend to be defined 'at the margin'. To define occupational supply as including all those who are currently employed in that occupation (stock) as well as all those who are qualified and seeking employment in that occupation (flow) overstates the ability of the market to respond to employment needs.

The strict definition of supply that excludes those already employed ignores the possibility that some people although already employed may yet seek to fill available job openings. Although difficult to measure, this could be handled as a mobility factor. However, to allow for mobility between occupations as a bonafide contribution to supply but disallow mobility within occupations, as in current NOICC practice, appears of questionable logic. If

intra-occupational mobility is considered inappropriate because it does not increase the total number of jobs available, it is difficult to envision how mobility between occupations per se adds to the number of available jobs.

As with turnover, movement between jobs within a single occupation could constitute a significant portion of the market activity for a given occupation. That the net number employed in the occupation would not be affected by intra-occupation transfers detracts from the fact that a significant number of job changes may have occurred. If movement within an occupation generates a net demand for training to update job skills, then these transfers have implications for vocational education. A basic assumption supporting their exclusion appears to be that skills within occupations are substitutable. Given the level of aggregation of current occupational classification schemes, this assumption is unfounded.

The requirement that persons be suitable for the occupation in order to qualify as a supply for that occupation introduced some interesting complexities. For example, if a person seeking employment is qualified for an occupation and therefore, by definition, qualifies as the supply for that occupation, do they also constitute a supply for all occupations for which they are over-qualified? Stated another way, can a person be counted as a potential supply for multiple occupations? Although possible in reality, such an allowance would create an unmanageable situation. Supply would almost universally exceed demand because individuals would be counted for each occupation for which they qualified, therefore resulting in an exaggerated estimate of the labor force supply.

In order to resolve this difficulty, individuals judged to be available for employment should be assigned as a potential supply only to that occupation for which they are most suitable. The occupation for which they are most suitable is defined as that occupation for which their skills and abilities are most centrally related. Thus, the determination of occupation most related to training plays a key role in the determination of labor force supply for a specific occupation.

Specific Data Elements

The following elements are suggested as sources of occupational supply:

- high school vocational education program completers and leavers as reported by the VEDS;

- postsecondary vocational education program completers and leavers as reported by VEDS;
- long-term adult vocational education program completers and leavers as reported by VEDS;
- high school nonvocational program completers/leavers;
- postsecondary nonvocational education program/leavers;
- higher education completers/leavers;
- private/proprietary school program completers/leavers;
- vocational rehabilitation clients who are rehabilitated and ready for employment;
- CETA clients ready for placement;
- community-based organization clients ready for placement;
- parole/probation clients ready for placement;
- returning veterans;
- in-migrants;
- unemployed workers;
- WIN program enrollees;
- re-entrance into the labor force;
- apprenticeship program enrollees;
- intra- and inter-occupation transfers.

Each of the above represents a potential contribution to supply. Not all, however, will be available for employment. Thus, it is necessary to adjust the total numbers in each category to reflect the proportion of that group that can be expected to seek employment. In some instances this portion can be based on existing data sources; in others, that proportion is, at best, an educated guess.

In a similar manner, assignment of the proportion of each of the above groups as a supply for specific occupations will require a determination of that occupation most centrally related to the education and/or training received. In order to accomplish this assignment, it is recommended that an occupational

and program code crosswalk be utilized. For vocational education programs, the occupational and educational code crosswalks developed by NOICC (1979) serve as an example. This crosswalk allows the user to determine a related occupation for each vocational program code. For any program such as vocational rehabilitation or CETA for which DOT codes are assigned to programs, occupations can be assigned by using the DOT to Standard Occupational Classification crosswalk codes. For those education and human resource development programs for which no classifications currently exist, occupational crosswalks will have to be developed before the outputs of these programs can be allocated to occupations as sources of supply. Practical methods for estimating the contribution of occupational mobility to supply need to be developed.

Occupational Detail

Occupational detail for supply should follow the same level of occupational specificity as for demand data. Supply data is therefore recommended to be collected for occupations as defined in the Standard Occupational Classification. Use of the unit group classification in the SOC would appear to provide a sufficient level of detail for supply estimation.

Geographic Detail

Supply data should be collected at the same level of geographic detail as demand data. Therefore, it is recommended that supply data be collected for each state labor market area and for regional substate areas comprising the balance of state.

Format

Format for the presentation of supply data should follow that recommended for demand data.

Frequency

Same as that recommended for demand data.

Project Timeframes

Same as that recommended for demand data.

Use

Availability of supply data can be used to answer a number of questions with policy and programmatic significance. Exemplary of some of these questions are:

- Which sources make the major contribution to the supply of trained personnel for an occupation?

- What is the relative efficiency of each supply source for an occupation in terms of percentage of program completers/leavers who are in the labor force?
- How do the various sources of supply compare in terms of percentage of program completers/leavers who enter the labor force?
- How does the supply in occupations differ across substate labor markets?
- What are the major competitive sources of supply for an occupation?
- What percentage of the total supply of an occupation is accounted for by vocational education?
- For which occupations does vocational education contribute a major source of the supply?

Answers to these and similar questions provide policy and decisionmakers with valuable information regarding the capabilities of education and training alternatives to provide a supply of trained personnel.

OCCUPATIONAL CHARACTERISTICS

Definition

Occupational characteristics generally refer to the properties of workers and/or jobs. Since workers are employed in jobs and occupation is a family of similar jobs, job specific information generally poses problem. This is frequently resolved by providing information on the "typical" or modal job that characterizes an occupation. In some cases it may be necessary to provide information on several modal or typical jobs in an occupation in order to capture the variability of jobs contained within an occupation. The use of modal or typical jobs is particularly applicable in those situations where jobs assigned to an occupation can be clustered into groups with similar characteristics. Turnover data indicate the extent of job stability. High turnover jobs frequently are coupled with low wages and may indicate less desirable placement opportunities unless other circumstances prevail, e.g., entry job for a variety of occupational tracts.

Specific Data Elements

Specific data elements with which occupations can be defined include:

- characteristics of a typical or modal job, including
  - duties and responsibilities

- wages
- working conditions, hours
- duration of employment
- licenses or certification required
- apprenticeship and/or training opportunities
- fringe benefits
- hiring channels customarily used
- transfer and/or promotional linkage with other jobs;

• desired characteristics of workers customarily hired for a typical or model job such as

- education attainment level
- skill level
- work history experience
- physical capabilities
- licenses and certifications held;

• occupational employment patterns

- stability of employment
- vacancies generally filled by internal promotions or external hires
- frequently offered as full- or part-time

• turnover in the occupation

- number of layoffs
- number of quits
- turnover rate.

Occupational Detail

Sufficient occupational detail would generally seem to be provided by the unit level of the SOC. However, for some occupational classifications, the jobs as defined by representative DOT codes may appear to be too disparate for

vocational education purposes. In those cases, jobs should be grouped into clusters within SOC occupational categories and information provided for specific typical or modal jobs. The typical job in this case would be that job which best reflects the characteristics of the job within the cluster.

Geographic Detail

Unless there is reason to suspect variability in typical jobs and workers customarily hired across substate labor markets, occupational characteristics can most efficiently be described at the statewide level. It may even be that occupational characterisitics remain relatively constant within a multi-state region.

Format

Form should follow that of typical job description format with specific sections devoted to duties generally performed, worker characteristics required, working conditions, training opportunities, sources of labor traditionally used and linkage with other occupations.

Frequency and Periodicity

For the most part, information on occupational characteristics remains relatively constant, with the exception of wages and turnover data, and can be updated on a three- to five-year interval. Turnover and wage data, because of its sensitivity to changing economic conditions, would probably need to be updated at least annually.

Use

Occupational characteristics are important to vocational educators because they provide information on those capabilities, abilities, and skills necessary for successful job performance. It is assumed that those characteristics descriptive of workers customarily hired for an occupation reflect those qualities deemed necessary by employers for success. It is therefore not surprising that characteristics of workers customarily employed was assigned the second highest need rating in the North Carolina SOICC survey and that nearly five out of every six respondents to the Oregon SOICC survey indicated a need for knowledge of the training or skills level of workers customarily hired. Similarly, information on the duties and responsibilities of typical jobs provides insight into the skills and knowledge required for job performance. Information on the factors contributing to job performance is of special use to vocational educators in the area of curriculum development. Given

information as to the targeted knowledge of skills and abilities to be developed, curriculum can be designed to provide learning experiences necessary to develop needed job skills and expertise. Improved insight into job requirements has implications for facilities and equipment planning, personnel development and research and development activities.

COMPLEMENTARY INFORMATION

Definition

As the title implies, information in this category complements the previous information which is more directly occupationally oriented. Information in this category can be classified into four types: demographic information, labor force data, economic indicators, and descriptive information on available human resources development programs. Demographics refers to information on the size, density and distribution of the total population. Labor force data pertains to descriptive information as to the size and composition of the labor force, whereas economic indicators provide a series of measures as to the health and prosperity of an area economy. Data on human resources development programs provides a descriptive inventory of the programs available in a specific geographic area.

Demographics

For an occupational information system to be maximally useful to vocational education, ideally it should contain the following data on an area population:

- education attainment level;
- age by sex distribution;
- income level;
- ethnic representation;
- education/training history;
- percentage of individual/families below poverty level;
- welfare recipients;
- migration patterns;
- interest in participation in further education and training to upgrade skills.

Labor Force Data

Statistics on the labor force should include:

- size of the labor force;
- participation rates by age, ethnicity and sex;
- unemployment rate by age, sex and ethnic group membership;
- characteristics of the unemployed including
  - occupation (last job)
  - education and training
  - length of unemployment
  - reason for separation;
- characterisitcs of the unemployed
  - number working at or below poverty level
  - number working part-time who would like to work full-time
  - number who desire to upgrade their skills;
- total area current and projected employment requirements due to replacement and expansion needs classified by occupation;
- total current and projected and employment requirements due to replacement and expansion needs classified by industry;

Economic Indicators

Economic indicators as a measure of the strength of the local economy ideally should include:

- industrial employment, hours and earnings;
- per capita income;
- wholesale sales;
- retail sales;
- new business starts;
- business expansions;
- residential construction permits;

- nonresidential construction permits;
- layoffs;
- value added by manufacturing.

Human Resources Development Program Inventory

An inventory on area human resource development programs should contain:

- education and training program characteristics which should include:
  - program title
  - program description
  - eligibility requirements
  - identification of program providers
  - support services offered;
- counseling and placement program opportunities as described by:
  - program title
  - program description
  - eligibility requirements
  - identification of program providers;
- financial assistance program containing information descriptive of:
  - program description
  - eligibility requirements
  - application procedures
  - contact sources.

Use

This information is of particular utility to vocational education in the determination of client needs for vocational programs, services and activities. This information permits an identification of those populations in need and provides an estimation of the incidence and prevalence of that need across the population. Economic data brings into relief those areas that are economically depressed with subsequently greater need for vocational education but less relative ability to pay. Because this information can be used to document

economic conditions, it adds particular utility for vocational education as factors to be considered in the allocation of Federal funds to local areas.

Geographic Detail

Complementary information should be available for the state as a whole, for each labor market area within the state and for each of the regional divisions of the balance of state not included in the labor market area.

SUPPLY/DEMAND ANALYSES

Definition

Occupational supply alone provides an incomplete picture of labor market needs. What is required is to match those who are available and seeking employment in an occupation with the number of job openings (vacancies) available in that occupation. Only by so doing can those occupations for which there is an over or under supply to meet existing demand be identified. The excess of occupational demand over supply is termed net demand and represents the principal data element for the planning of vocational education programs.

Occupational Detail

Occupational detail should conform to the structure of the Standard Occupational Classification System.

Use

Net demand is a measure of the unmet labor market needs for an occupation. Assuming that skilled training should only be offered for those occupations whose skills are demanded in the market place, net demand is the best single indicator of the need for occupational work skills. Planners are hard put to justify offering vocational education programs for which there is no demand or for which supply exceeds demand. In both instances, this condition would result in a negative net demand.

Net demand can be used in the following manner to identify those occupations in which new or expanded programs are needed. First, compute the net demand for each occupation under consideration. The net demand for each occupation indicates the market strength for that occupation. Each occupation should then be ranked according to the magnitude of the net demand. A cutting score on net demand should be established such that even though the net demand may be positive, it is not considered worthwhile to offer a new or expanded program unless the net demand exceeds a fixed level.

Those occupations whose net demand exceeds a fixed level represent the candidate occupations for which new or expanded course offerings may be required. Since net demand can be considered as a measure of the market potential, the concept of market share accounted for by vocational education has a meaningful interpretation. Market share in this context means that portion of net demand which can be reasonably expected to be accounted for by vocational education completers/leavers. Market share estimates should be established for each occupation whose net demand exceeds the cutting score. Market share is computed by estimating a market share percentage and applying that percentage against the net demand. The result will give an estimate of net demand that can reasonably be expected to be filled by vocational education.

Occupations should be re-ranked using their adjusted market share net demand figures. Given this operation, the next step is to allocate the adjusted net demand to vocational education programs corresponding to that occupation. Vocational education programs corresponding to specific occupations can be determined from the instructional code to occupational crosswalks developed and disseminated by NOICC (1979) or can be determined through the use of a custom developed crosswalk.

Once instructional program codes have been assigned to occupations, the adjusted net demand for that occupation can be allocated to corresponding programs through one of several means. One such procedure is to allocate adjusted net demand to programs in the same proportion as the number of instructional program graduates/leavers who find employment in that occupation is to the total number of completers/leavers employed in that occupation. For example, if 500 completers/leavers find employment in an occupation having a total of 600 completers/leavers employed in that occupation, then 5/6th of the adjusted net demand for that occupation would be allocated to that program.

A more qualitatively oriented alternative is simply to allocate adjusted net demand to corresponding instructional programs according to subjective judgment. Once adjusted demands have been allocated to individual instructional programs, the adjusted net demands should be summed for each instructional program, and the programs ranked by accumulated totals. Programs that have the highest adjusted net demand should be accorded the higher priority in the formulation of planning goals based on employment and training needs. These priorities thus serve as the basis for all vocational education planning

efforts for programs designed to serve state and substate occupational employment needs.

Geographic Detail

Net demand estiamtes should be provided by occupation for all state labor market areas and for each regional subdivision of the balance of state not otherwise indluded in the labor market.

CHAPTER 4

AVAILABILITY/SUITABILITY OF OCCUPATIONAL INFORMATION FOR VOCATIONAL EDUCATION[1]

OCCUPATIONAL DEMAND

Availability

Job vacancy data is currently available from two data sources. These sources are:

1. Employment Service Job Bank;
2. Employment Security Automated Reporting System (ESARS).

The Job Bank is a computerized system containing all unfilled job openings that are listed with local employment security offices. Each entry (unfilled job order) is described according to the job location, occupational title and code, wage rate, employer and job requirements. Entries are updated regularly and appear as microfiche output which provide information on the number of job openings available, number unfilled at the end of the month, number 30 days old or more, occupational category and six digit occupational code, employer job title, salary-wage range, and job bank district identification number. In addition to microfiche output, additional system output includes a computerized listing of unfilled job openings as of a specified day and a monthly summary of those jobs most frequently listed classified by DOT code and employer job title.

The Employment Service Automatic Reporting System (ESARS) is a computerized management information system for recording, analyzing and reporting operational transactions at the field office level. Field office transactions are defined to include such activities as new applications, renewals, counseling, testing, placement, openings received or cancelled or any other client related activity. Of particular interest is ESARS Table 96. Table 96 reports among other things, the total nonagricultural unfilled job openings at the close of the fiscal year plus all job openings received during the current reporting period. These accumulated job openings are totaled and reported by three digit DOT codes.

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[1]Materials on availability drawn in part from "A Framework for Developing an Occupational Information System," National Occupational Information Coordinating Committee, Washington, D.C., 1979.

No data sources are currently available that report projected or anticipated future hires by occupation. The closest proxy is the data on occupational requirements provided by the Occupational Employment Statistics Program (OES). This program provides estimates of current and anticipated occupational employment generated by overall growth or decline in the level of occupational demand and the demand generated by the need to replace those workers who will leave because of normal attrition factors.

The Occupational Employment Statistics (OES) program is comprised of three components: a three-year cycled survey of employers, a system of industry by occupation matrices and state and area occupational projections. The employer survey is designed to collect wage and salary employment data by occupation and industry from a sample of nonfarm establishments. The matrix component of the program involves a set of tables for the nation, for each state and for the District of Columbia in which total employment is classified by occupational categories, industrial sectors, and class of workers. Procedures are currently being developed that will allow states to upgrade the matrices using results from the employer surveys. The projections component of the program produces projections of occupational requirements at the state and sub-state geographic area levels. Procedures are designed to allow state employment agencies to incorporate localized information such as knowledge of economic conditions, plant openings and closings and technological innovations to ensure that projections are reflective of local conditions.

Suitability

The suitability of current data on job vacancies is questionable on several grounds. Perhaps the most serious is limitation and scope. Job vacancy data are currently collected only for those job openings reported to local employment security offices. It is widely known that only a fraction of the available jobs are reported to employment security. Not all states and localities have access to job bank data. Availability of job bank data only on microfiche restricts access to the data and limits its utility. In many states, summary reports of job vacancy data is available only on computer tape with no provision made for hard copy results nor for dissemination. Assignment of DOT codes to job vacancies are not necessarily standardized across local employment security offices. Job flow summary reports include only those vacancies which are "hard to fill." ESARS vacancy data are subject to the

same limitations--coverage restricted to listings with employment security agencies, inconsistent application of DOT coding practices, a selection bias in that jobs listing tend to show wages and salaries at the bottom tier of wages paid for the occupation in which the vacancies are classified.

In addition to these collection limitations, job vacancy data is subject to conceptual and measurement problems. The National Commission on Unemployment and Statistics in their final report raised a question as to "whether job vacancies, however defined, can be adequately measured and interpreted." According to the Commission, defining vacancies as job openings for which firms are actively seeking to recruit new hires, ignores the possibility that hires often occur without active employer recruitment. Job vacancy statistics run the risk of being dominated by low wage-high turnover occupations. Difficulties in obtaining a representative sampling might likely be encountered with occupations experiencing high numbers of vacancies reluctant to report because of an increased reporting burden.

These difficulties notwithstanding, job vacancy data provides the most intuitively direct measure of job openings to be filled by external hires. It is these openings that provide the 'doorway of opportunity' for those seeking employment and targets the efforts of those offering guidance and placement services. Information on current employment by occupations provides little assistance in the job search process nor does it direct the placement to those jobs which have current employment opportunities.

The problems are compounded when one attempts to predict future job vacancies. Vocational education has historically depended upon employer judgments as to the number of anticipated job vacancies. Yet employer judgments of future occupational employment requirements has been abandoned by the Department of Labor in favor of indirect statistical prediction models which are believed to produce more reliable estimates. The state and area occupational projection component of the OES program provides state employment security agencies with a standardized procedure for the projection of occupational employment requirements. As indicated previously, these projections estimate employment requirements by occupation due to growth in that occupation and those due to replacement.

Although serving as a strong indicator, it should be noted that occupational employment requirements do not always translate directly into the

anticipated number of future hires in that occupation. Anticipated job openings in an occupation need not always be filled by external recruitment. Job openings which are filled by internal transfers could result in the displacement of the demand for new hires to those occupations that represented the "portals of entry" into the occupation. Unless these portals of entry are in the same occupational classification, occupational requirements could present a distorted picture of occupational demand as represented by the hiring of new applicants.

Occupational requirements tends to underestimate the level of demand because it fails to include replacement needs resulting from job changes and from labor turnover. Turnover is frequently associated with less desirable low wage jobs whose inclusion as a goal for vocational education program planning is questionable. However, exclusion of turnover as a contributor to demand does result in a significant omission when considering the demand for many occupations for which vocational education completers/leavers could constitute a realistic source of supply.

Although admittedly having shortcomings as a measure of projected occupational hires, the OES program represents the best currently available demand system. Collection and estimation procedures are uniformly defined and systematically applied according to standardized operational procedures. The utility of OES as a demand system does, however, suffer from several operational limitations. First, the program is not operational in all 50 states. Second, the program at present is confined to occupational information at the state level and for selected SMSAs. Third, the self-employed, agricultural and private household workers are presently not included although work is underway to remedy this deficiency.

OCCUPATIONAL SUPPLY

Availability

Supply of trained workers for an occupation comes from the following major sources:

- education and training program completers/leavers;
- unemployed persons who qualify for and are currently seeking work in an occupation;
- qualified people who migrate to the area seeking work in the occupation;

- occupational transfers;
- qualified new entrance and re-entrance into the labor force are seeking employment in that occupation.

Information on completers and leavers from various educational and training programs is provided by the following reporting systems:

- Vocational Education Data Systems (VEDS)
- Higher Education General Information Survey (HEGIS)
- Non-Collegiate Postsecondary Schools Survey
- State National Apprenticeship System (SNAPS)
- CETA Prime Sponsor Reporting Requirements
- Vocational Rehabilitation Management Information System

VEDS data sources provides the most comprehensive information on the contribution to occupational supply from vocational education completers/leavers. VEDS provides that each state conduct a follow-up activity of completers/leavers of programs training for specific occupations. This follow-up may be conducted either by a complete enumeration or by a statistica sampling procedure. Follow-up information is reported for vocational education program completers and leavers who have completed over half of their program. For each six digit OE instructional code, information is provided as to the number employed in the field relating to training, the number employed in a field not related to training and not pursuing additional education, numbers pursuing additional education, numbers unemployed and not pursuing additional education, those not in the labor force and not pursuing additional education and those for which the status is unknown. The field of employment and average hourly salaries by instructional programs is reported for all completers and leavers included in the follow-up activities. Field of employment is reported according to twenty-six, two-digit Standard Occupational Classifications (SOC) category codes.

The Higher Education General Information Survey (HEGIS) is a periodic enumeration of those accredited public and private colleges and universities that grant associate degrees or higher. In addition, a limited number of proprietary schools are included. Supply-relevant data is presented in the form of number of degrees conferred by field of study. The HEGIS survey is comple-

mented by a bi-annual survey of all known public and private schools that offer occupational programs to less than the baccalaureate level. For each occupational program coded according to the USOE classification system, enrollment data is classified by sex and full-time/part-time status. A 25 percent sample of schools is used to gather more specific programmatic data including program changes, length of program, number of completers, and number of leavers with a marketable skill.

Prime Sponsors are required by legislation to report by enrollments, completions, job placements, and training-related placements; by detailed occupations or training codes for classroom and on-the-job training programs [Sec. 313)(G)(1)(B)(PL 95-524]. Detailed occupational or training code is defined as any code that is comparable with the Standard Occupational Classification at the four-digit level.

The State and National Apprenticeship System (SNAPS) is a computerized system of information descriptive of apprenticeship programs within all states and trust territories. Of interest for supply purposes, the SNAPS system provides reports on both the industry and the occupation in which an apprentice is registered. Occupations are described according to a nine digit DOT code.

Vocational rehabilitation management information system provides information as to the occupational placement of VR clients. Placements are recorded according to four digit DOT codes.

Data on the contribution of qualified unemployed seeking employment to the pool of occupational supply is available from two major sources--the characteristics of the insured unemployed (ES-203) and the ESARS. Characteristics of the insured unemployed reports the results of a sample of UI claimants. Descriptive characteristics of UI claimants include age, sex, race, type of claim, number of weeks claimed, duration of employment and occupational and industrial attachment based on the basis of the last job held. ESARS provides summary tables of the characteristics of individuals serviced by local employment security agencies. Characteristics on which descriptive information is provided includes sex, age, ethnic group, occupational attachment, income, welfare and/or claimant status, veterans status, handicapped, educational attainment, family status and others.

Information on the contribution to supply from labor market migration is obtained principally from the U.S. Census. Flow of workers into an area can

be determined by an analysis of their reported previous locations. Migration data, both geographic and occupational, is also provided by the Current Population Survey (CPS). This survey is a monthly sample of 55,000 households which provide detailed information on the personal characteristics as well as labor force status of the repsondents included in the sample.

Data on new entrants into the work force is provided by the Employment Service potential. This procedure utilizes UI information provided from employers to estimate the number of new hires occurring in a quarter. Employer counts are aggregated by industry and local office area to produce estimates of the total number of new entrants into the labor force.

Suitability

VEDS data as a measure of supply has several inherent limitations. The coverage of the VEDS is limited only to those vocational education programs contained in the state plan. Since the extent of vocational programs not covered in the state plan is unknown, the impact of this limitation on supply is problematical. By definition, certain other populations are excluded from supply considerations. Exclusions include short-term adults who enroll in programs of less than 500 hours duration, leavers of vocational education programs who complete less than 50 percent of their program, and completers and leavers of consumer and homemaking programs and industrial arts programs. Allowing states to estimate follow-up results on the basis of samples introduces the possibility of statistical sampling bias into the results. Use of two-digit SOC codes for the classification of follow-up data may result in an aggregation of supply data that is too coarse to be useful for vocational education planners.

At present, there is not uniformly accepted standardized crosswalk between OE instructional codes and four-digit levels of the Standard Occupational Classification. Nor is any standardized procedure readily available for estimating what proportion of vocational education completers/ leavers can be considered as supply for specific occupational categories. The same lack of crosswalks and standardized procedures inhibits the utilization of HEGIS data as a source of information on the supply coming from postsecondary institutions. In the absence of these prerequisites, HEGIS remains virtually useless as a source of supply data. The same limitation restricts the utility of the Non-Collegiate Postsecondary School Survey as a source of information on the

supply contributed by postsecondary occupational programs at the subbaccalaureate level. Since the response is not mandatory, no information is available on those schools that choose to respond to the survey.

Reporting only CETA job placements and training-related placements by detailed occupational codes will result in an understatement of the supply since those CETA completers seeking employment but not placed will not be reported. Reporting only those placements for classroom and on-the-job training programs also excludes a large segment of CETA clients whose program experience may qualify them for employment. Unless a follow-up activity is instituted which seeks to ascertain the employment status of CETA program completers/leavers, it will be impossible to determine those who are actively seeking employment.

Apprenticeship data provided by the SNAPS program is not without limitations imposed by restriction of scope and methodology. Since SNAPS includes only registered apprenticeship programs and registration is voluntary, many programs are unregistered and hence not included in system coverage. Utilization of a unique occupational grouping for DOT coding introduces translation problems that inhibit the easy allocation of the output of apprenticeship programs to DOT codes.

Coding problems regarding assignment of employment outcomes of closed vocational rehabilitation cases serves to restrict the utility of this source. Employment of vocational rehabilitation clients is recorded in most instances using the first four digits of the six digit DOT codes for the 3rd edition published in 1965. The fact that only four digit codes are used and that these codes are from the 3rd edition inhibits direct translation to occupational classification.

Net migration data for use in determining occupational supply at state and sub-state areas is available only from Census sources. The use of SOC codes with minor modifications in the 1980 Census will increase the utility of this information. However, unless historic patterns are reversed, data will not be available for use in a timely fashion. Also, data on migration may not be available for sub-state, labor market areas.

Information on the contribution to occupational supply due to mobility between occupations is almost totally lacking. Deletion of occupational mobility data from the 1980 census leaves CPS as the only source of occupational

mobility data. However, limited sample sizes make reporting of mobility data unreliable even at the national level for occupations without significant employment. Given these restrictions, mobility data will be of limited use in estimating contributions to occupational supply at state and sub-state levels.

There is almost a complete void of information regarding the characteristics of new entrants or re-entrants to the labor force. This omission is unfortunate in that vocation education has a clear mandate to serve the needs of special populations. Without adequate information as to the universe of need and the nature and extent of employment problems experienced by these special groups, the capability of vocational education to improve their employment opportunities will be severely curtailed.

The unemployed adds a contribution to occupational supply that is frequently ignored in vocational education planning. A rationale for their omission can be easily understood if the unemployed are regarded as competing with vocational education completers and leavers for a limited number of employment opportunities. However, if the unemployed can be made more employable through the provision of training to upgrade their skills to meet employment needs, then this group becomes another special population with needs for vocational education training and services. Information on the characteristics of the unemployed is currently available on ES-203 reports which provide demographic data on persons maintaining an active unemployment insurance status. ES-203 data is limited by sample size, accuracy of occupational coding and is frequently nonavailable for sub-state labor market areas. Scope of the data is also restricted. Only those persons covered by an insured unemployment program are included. In some instances, this may count for only a small fraction of those seeking employment.

OCCUPATIONAL CHARACTERISTICS

Availability

A variety of data sources are available for the provision of information regarding occupational characteristics. Of those sources, three are particularly noteworthy. These are: Occupational Outlook Handbook, Dictionary of Occupational Titles, and occupational guides and brochures prepared by state employment security agencies.

The Occupational Outlook Handbook prepared by the Bureau of Labor Statistics (BLS) has information on the job duties, educational requirements, employ-

ment outlook and earnings and working conditions for several hundred occupations. The handbook is complemented by the Occupational Outlook Quarterly which examines occupational issues in specific areas.

The Fourth Edition of the Dictionary of Occupational Titles is a dictionary of occupation descriptions for more than 20,000 occupations in the U.S. economy. Each occupation described is identified in terms of an occupational code, an occupational title and an industry designation. Job duties and responsibilities are described in terms of a lead statement which provides an overview of job activities supplemented by task elements and statements which provide additional detail as to job duties and responsibilities. The occupational code designator is designed so that the middle three digits reflect the rating of the job according to the extent to which the job performance requires the worker to function at some level of exposure in relation to data, people and things.

State employment security agencies have responsibility for the publication of occupational guides and brochures. These guides pertain to a specific occupation and include such areas as job duties, related tasks, working conditions, hours, benefits, entrance requirements, promotional systems, training programs, job search methods, and hiring outlooks.

Additional data on occupational characteristics are provided by census data, BLS area wage surveys, and ESARS output. Census information, particularly that provided by the Current Population Surveys, profiles certain occupational fields by demographic characteristics of workers employed. Occupational wage data is provided by an annual survey conducted by BLS covering 76 occupational categories in SMSAs throughout the country. Occupational categories surveyed include office, clerical, electronic, data processing, drafting, industrial nurses, maintenance, toolroom, power plant, custodial, and material movement jobs. In addition to area wage surveys, industry wage surveys are conducted for a sample of occupations selected to represent the full range of activities performed by workers. Wage information is additional, supplied by data available on wages from job applications or job orders filed with Employment Security Agencies and reported on the ESARS system. In addition, ESARS maintains data on the hiring channels customarily used by employers.

Suitability

Most of the available data on occupational characteristics does not contain information uniquely descriptive of the conditions associated within specific labor market areas. Occupational Outlook Handbook and the Dictionary of Occupational Titles provide a generalized description of occupational characteristics that may not reflect local uniqueness. Occupational wage information is restricted to those areas sampled and its generalizability consequently limited. Occupational descriptions prepared by state employment security agencies are descriptive of regional conditions but may not be updated at sufficient intervals to provide adequate descriptions of current conditions. Problems with sample size restrict the generalizability of demographic characteristics of workers by occupations that may be obtained from the Current Population Survey.

The most significant gap for the development of an occupational information system is that occupational characteristics are not available for a common occupational classification system. No information on occupational characteristics is provided at the level of occupational detail provided by fourth-level SOC classifications. Whereas the Occupational Outlook Handbook is somewhat too general in its coverage, the Dictionary of Occupational Titles is too specific for use in vocational education planning and related activities. What is needed is a level of occupational detail provided at an intermediary level. The SOC unit level classifications would appear to provide a happy medium between the level of specificity of the DOT and the more macro level of generality exemplified by the Occupational Outlook Handbook coverage.

COMPLEMENTARY INFORMATION

Availability

Complementary information is generally available from the following data sources:

- Census
- Current Employment Statistics
- ESARS
- Local Area Unemployment Statistics Program
- Labor Market Information Programs
- Unemployment Insurance Data

The Census Bureau is a rich source of information on complementary information for possible inclusion in an OIS. The following represents a list of selected sources that would appear to provide valuable information:

- Census of Agriculture. The Census of Agriculture is a quinquennial census that provides statistics on the number of farms, farm characteristics including age and tenure of operators, livestock, poultry, livestock and poultry products, crops, crop values, irrigation, drainage, type of farm operations and farm finances.

- Census of Construction Industry. Periodic census of constructions industries that provides information on employment, payrolls, value added, capital expenditures during the year, and type of construction. Monthly estimates of total housing starts and total of new housing units started by private and public ownerships and summary of statistics of a number of new housing units authorized by building permits and public contracts are also separately available.

- Census of Governments. A quinquennial census that provides information on employment, tax revenues and expenditures for Federal, state and local government units.

- Census of Manufacturing and Mineral Industries. A quinquennial census that contains statistics on employment, payrolls, manhours, value added by manufacture, inventories, new capital expenditure, quantity and value of materials consumed and products shipped. Data are reported separately for manufacturing and mineral industries.

- Census of Population. This census provides statistics on the demographic characteristics of the American population including such variables as age, race, sex, marital status, disability, work status, educational obtainment, occupation and income. Housing characteristics are also included. Starting with the 1980 census, will be subsequently conducted on a five-year basis.

- Census of Retail Trade, Wholesale, and Selected Service Industries. The census includes statistical data on number of establishments with employees, employment payroll and sales for retail, wholesale and selected service establishments in the United States.

The Department of Commerce publishes the data series entitled County Business Patterns. This series contains information on first quarter employment, taxable payroll, number of reporting units and employment class of reporting untis by county and by industry classified according to Standards Industrial Classification levels. Information is derived from the employment and payroll information reported on Treasury Form 941, Schedule A, and is supplemented by a special survey of selected multi-unit employers.

The Current Employment Statistics program of the Department of Labor gathers data on employment, payrolls, and hours from a sample of over 160,000 reporting units. Data collected on the BLS Form 790 series is used to provide information on total employment, employment of production and nonsupervisory workers, women employed, average earnings, average weekly hours, and average overtime hours in manufacturing. These data series are used as the basic data input into various BLS publications including Employment and Earnings and the Monthly Labor Review.

ESARS contains demographic information on the characteristics of those served by employment security local field offices. Demographic characteristics include age, sex, ethnic group, occupational attachment, income, welfare and/or claimant's status, health status, handicap educational attainment, and family status.

The Local Area Unemployment Statistics program (LAUS) is a DOL sponsored program to produce unemployment statistics for local areas. The estimate for the unemployed is based on UI claimants, those who were last employed in non-covered industries and those who are entering the labor force for the first time or re-entering the labor force after a period of separation.

Under the Labor Market Information (LMI) Program of the Department of Labor, state employment security agencies are required to prepare core products descriptive of labor market conditions. Core products of particular interest to vocational education include the LMI newsletters, Annual Planning Information, Occupational LMI, Planning Information for Vocational Education, Directory of Labor Market Information, LMI on special groups and the results of LMI research. The LMI newsletter is designed to disseminate current information on employment and unemployment conditions, to present an analysis of factors influencing the labor market and to discuss forthcoming LMI Products. Annual planning information is designed for the planners of education and employment training programs and provides current, as well as historical and projected information on employment, unemployment, occupational trends, characteristics of the population and labor force, economically disadvantaged underutilized persons and other special interest groups. Occupational LMI is oriented to the presentation of occupational information including quarterly supply/demand analysis, occupational projections, job search information, wage data and OES survey data in those states having OES programs. Planning information for

vocational education presents an analysis of the employment requirements in those occupations for which vocational education would seem appropriate. Directory of Labor Market Information is a catalog giving a complete listing of all LMI releases and publications prepared on a regular basis plus the list of periodic releases and one time studies or analysis. LMI for special work groups requires that each state employment security agency prepare one or more publications on youth, women, veterans or blacks and/or Hispanics. These publications should provide demographic characteristics on the special populations as well as the number of employed and unemployed. States are given an option to carry out one or more research projects dealing with labor market analysis which may be most appropriate for the state and/or local areas.

The ES-203 provides demographic data on those persons in active unemployment insurance claims status. Data are reported on the basis of a monthly sample of claims and include information on age, sex, race, type of claim, number of weeks claimed, duration of employment, and occupation and industrial attachment as of the last job held.

Suitability

The variety of available data to complement occupational demand and supply poses a special problem for the design of an OIS. In the absence of a clear-cut criteria to guide the selection, the tendency is apt to favor an extreme position--either include everything that appears to be relevant for indicating socio-economic conditions or collect only the barest minimum for which a need exists.

Neither extreme results in maximum benefits to the users. In the "shotgun" approach to complementary data inclusion, much effort is expended on the collection of data that may never be used. The supposition is made that data are equivalent to information and that adding additional data will enhance user understanding. The "rifle" approach of only collecting what is immediately needed frequently results in a data set constricted in scope by perceptions of current need, many of which may be generated because of compliance requirements.

What is more efficient is to have a distinct rationale for the collection of complementary data. This rationale should emanate from a conceptual model of a labor market as a micro socio-economic system whose functioning is indicated by select variables. This model should serve as the vehicle for promoting user understanding of labor market functioning and should provide the basis for user interpretation of data results.

SUPPLY/DEMAND ANALYSES

Availability

Data on the occupational supply/demand interface is available through the labor market information core product, "Planning Information for Vocational Education." This core product is prepared annually for each state and SMSA. Information includes estimation of the demand, the corresponding supply and estimated net demand for occupations for which vocational education would seem appropriate.

Suitability

The procedure used for the allocation of demand and supply to vocational education instructional program codes is not readily understood by vocational educators, thereby limiting its acceptance. Supply estimates are frequently incomplete since they are limited to contributions made by vocational education completors and leavers and the unemployed as available from employment security records. Demand is underestimated in that intra- and inter-occupational transfers are excluded.

CHAPTER 5
RECOMMENDED ROLE OF OIS IN MEETING PLANNING AND/OR OPERATIONAL INFORMATION NEEDS

Congress was emphatic in their mandate that an occupational information system be developed and implemented to meet the common needs of vocational education and employment and training programs at the national, state and local levels. Responsibility for carrying out this mandate was invested in a National Occupational Information Coordinating Committee and a network of state occupational information coordinating committees. According to Congress, the purpose of NOICC and its associated networks of SOICCs is two-fold; first, to promote increased coordination between vocational education and employment and training planners, and administrators at the national, state and local levels through the joint use of an occupational information system designed to serve their common needs; and second, to insure that occupational supply and demand data, based on uniform definitions, standardized estimating procedures and a standard occupational classification scheme be made readily available. While not explicitly stated, Congress undoubtedly meant the occupation information system to be the principal means through which vocational education, employment and training, vocational rehabilitation and other related programs would achieve an integrated, consistent and coordinated approach to providing quality human resource development programs consistent with current and emerging labor market requirements.

The means for carrying out this congressional mandate has been wisely left to NOICC discretion. In order to assist in this effort, remarks and recommendations in this chapter will be addressed to major topics of system organization and system structure. The section on system organization will deal with system development roles and responsibilities at national, state and local levels and includes a discussion of the implications of the system concept when applied to the organization of occupational information. System structure will treat the recommended informational content of an occupational information system. These suggestions will be divided into recommendations that are feasible for current implementation and recommendations that have implications for long-term content considerations.

SYSTEM ORGANIZATION--AN AGENDA FOR ACTION

National Level

Enabling legislation gives NOICC responsibility for improving the coordination between and the communication among Federal agencies involved in the planning and administration of education and employment and training programs. This coordination and communication is to be achieved through the use of a common occupational information data base. To be assured that this mandate is implemented, NOICC should be assigned legislative authority and responsibility for the coordination of all occupationally related data produced under federally funded programs. NOICC's responsibility would be to assure that occupational data produced by Federal agencies were compatible with respect to OIS requirements.

To make such coordination a reality would require that NOICC have authority to review and approve the design of all federally funded systems for the collection of occupational demand and supply data. Occupational data collection efforts supported by various agencies should be reviewed to detemine the extent of compatibility with OIS system requirements promulgated by NOICC. This review should center on assurances as to the uniformity of definitions of data elements collected and the extent to which estimating practices and procedures were in accordance with NOICC quality control standards. NOICC approval of all plans to collect occupationally relevant data should be required as a prequisite for Federal administrative budgetary approval. Unless this centralization of responsibility is forthcoming, NOICC will be powerless to meet their mandate to improve agency's linkages through the provision of an integrated and coordinated occupational data base.

As an outgrowth of their role in the integration and standardization of occupational data, NOICC should be given legislative responsibility for preparation of an annual report to Congress detailing the nation's need for trained manpower by occupational categories and the current and anticipated supply of trained personnel to meet these needs. This report would make centrally available, at the national level, information on occupations in short supply and the effectiveness of education, employment and training and other human resource development programs in matching its output with labor market needs. Such information, if centrally available, would be of considerable policy significance for Congress, Federal education and employment and

training planners and administrators and other policymakers concerned with improving the match between job needs and the output of federally assisted programs.

Included should be a report of NOICC's current year progress, a plan for the next year's activities and a discussion of major factors inhibiting implementation of the OIS and recommended strategies for their resolution. Thus, in addition to conveying useful policy oriented information, the report would also serve as an accounting of progress, a plan for the future and an analysis of the most pervasive problems inhibiting progress toward the stated goals. All member agencies should be required to sign-off on the report. Provisions should be allowed for agencies to express dissenting positions in a minority report.

State Level

SOICCs have the legislative responsibility of implementing an occupational information system that will meet the common informational needs of the member agencies. Implications of those responsibilities should include (1) preparation of a system development plan, (2) submission of data on statewide demand/supply and the demand/supply interface, and (3) preparation of an annual plan and progress report.

A long-range system development plan should be prepared and should serve as the guiding document for the design, implementation, operation and evaluation of the OIS system in each state. The plan should specify system development goals and objectives, activities to be performed, allocation of activities to various agencies and the means proposed to insure that the results of the system will serve the common occupational information needs of the member agencies and will result in a more integrated and coordinated set of programs. A copy of the plan should be sent to NOICC and the Federal agencies responsible for supervising and administering the Federal programs that provide assistance to each of the member agencies, i.e., Office of Education, Employment and Training Administration and the Rehabilitation Services Administration. SOICC's should be encouraged to take a functional approach to the system planning and to consider carefully the rationale for the assignment of system functions to specific state agencies.

The problem of allocation of functions is central to implementation of an OIS and should be given careful consideration. The design question as to

whether occupational data should be centrally processed or whether each agency will have responsibility for the processing of occupationally-relevant data under their jurisdiction leaving the OIS the clearing house function of linking agency systems is a crucial consideration in system design.

As an OIS will undoubtedly have to be computerized, the question as to the allocation system functions across agency systems must ultimately be addressed. This will require cross-communication between agency information systems and raises a host of problems heretofore not encountered. Since agency data bases must be accessible to inquiry in order to link into a common system, problems of incompatibility in terms of system definitions and estimating procedures will be encountered and need to be resolved in order for an OIS to function. Because many agency systems have been preprogrammed to produce reports according to fixed format categories, linkage between agency's systems may require extensive modifications to existing programs. Questions of client confidentiality will be encountered and need to be resolved before data can flow smoothly between member agency data systems.

These issues should be resolved by each SOICC in the preparation of their long-range system development plan. Through joint participation in system development planning and implementation, agencies will come to a better understanding of their needs for data, the joint uses to which data can be put, problems involved in the collection, storage and retrieval of data to serve their uses and the resolution strategy that will best meet the unique configurations of each state. At least in theory, member agencies should move closer to a common accord in the process of jointly planning and implementing a system to serve their common needs. In that sense, SOICCs will serve an important function in promoting interagency coordination and communication through their joint dependency upon common data.

The intent stated in the long-range system development plan should be updated annually through the preparation of an annual plan and progress report. This document should report on the progress achieved to date in meeting system development goals, the problems and slippages encountered, actions taken to overcome these difficulties, goal revisions and reasons for revision, recommended needs for technical assistance and samples of system documentation as may be required to demonstrate progress in system development. With modifications to address these requirements, the annual plan submitted by each SOICC in conjunction with their grant application could serve this purpose.

Local Level

An occupational information system, in order to ultimately result in program improvement, must involve local users. Local users should include representatives from the local agencies of each of the member SOICC agencies as well as representatives from the private sector and the local lay community. It is crucial to the longrun success of an OISS effort that business and industry participation be assured and that public support of the endeavor be sought. Local involvement can be achieved through two major means: service on support committees and an extension of the SOICC organization to the sub-state area level.

Local participation in support committees can be achieved both at the technical and more general policy advisory levels. At the technical level, local representatives from the various SOICC member agencies can be invited to participate with state personnel in the resolution of technical matters encountered in system design, implementation, and operation. Membership should be selected according to their technical expertise and their ability to provide guidance in the system development efforts. Representatives of local user agencies, private sector, and the public can be involved through the vehicle of an advisory committee. Advisory committees can serve the function of creating public awareness and support for system development efforts and can provide user inputs in the early stages of system planning. These inputs will serve to assure system responsiveness to local needs at the operational stage.

The SOICC organization can be extended to the sub-state level through the formulation of regional occupational information coordinating committees. Regional committees need not have their membership confined by legislative stipulation and could be expanded to include all local, public and private agencies with an interest in improved occupational information for programmatic purposes. Local committees could be responsible for the assessment of local need for occupational information, assessing the adequacy of existing information to meet these needs, development of recommendations as to how the occupational information needs could be better met, monitoring the collection of occupational information at the local level and evaluating the effectiveness of an occupational information system in meeting local needs.

An occupational information system to serve local needs must be addressable at the local level. That is, the system must provide for access by local users and must be capable of providing responses in a fixed format report style or in a more customized service response to user inquiries. The fixed format publication is the near universal mode for dissemination of current occupational information. Efficient from a cost standpoint, this publication format frequently is of limited utility because of delays in presentation of the information, lack of knowledge as to its availability, inability of the users to format the data to better fit their use and limited user access to the entirety of collected data available.

To overcome these difficulties and to be maximally usable to a variety of user groups, an OIS must be flexible so as to serve a variety of user informational needs. This might be accomplished by terminals that provide users online access to a central bank of occupational information that can be accessed and instructed to provide information in a variety of format alternatives. Or, depending on conditions of cost and efficiencies, through batch output with reasonable turnaround times. In either case, the system should have the capability to permit users rapid access to information contained in the occupational information system in a format to suit their needs.

SYSTEM STRUCTURE

Suggestions for Immediate Actions

NOICC should take immediate actions to establish the requirements definitions for an OIS. Requirements definitions should contain the following elements:

- OIS objectives;
- description of OIS input requirements;
- description of OIS output requirements;
- OIS performance criteria;
- functions needed to transform OIS input to output;
- alternative OIS design configurations;
- design criteria for selection of OIS design strategy.

Once the OIS requirements definition is prepared, it should be sent to each SOICC. SOICCs should be requested to submit a long-range system develop-

ment plan for designing an OIS in their state that would meet the requirements definitions. The requirements definitions should be sufficiently well-defined so as to guide each SOICC in the development of their plan for an OIS designed around their unique constraints, yet able to meet the stipulated performance requirements.

OIS performance requirements should be oriented to the development of the capability in each state to produce annually the required demand/supply interface report as a minimum system output. System input requirements to produce this report should stipulate that the data elements measuring demand be drawn from the OES system. All the elements that will be required to arrive at supply specifications should be delineated. It is suggested for the purposes of expediency that data on vocational education completers/leavers supplied by the VEDS, information on placements from CETA funded classroom and on-the-job training programs and vocational rehabilitation placements be given priority consideration for initial system development. If CETA data is not available to the SOICCs from each of the state prime sponsors, arrangements may have to be made with DOL to secure this information from the appropriate regional offices. If this information is not available, the Secretary of Labor should instruct prime sponsors to begin collection of this data immediately.

Standardized procedures for the allocation of vocational education completers and leavers to occupations should be provided. It is anticipated that OE instructional program code to occupational crosswalks would be an integral part of this transformation and should be provided by NOICC as part of the system requirements definitions. The OIS requirements definitions should specify that the SOC be the officially sanctioned occupational classification system. To provide the requisite amount of occupational detail, crosswalks should be provided utilizing the four level unit SOC classifications.

The design of an OIS should proceed incrementally. Immediate priority considerations should be given to the development of the crosswalks that will enable linkage of OES demand estimates and VEDS supply estimates with SOC occupational categories. If data from CETA prime sponsors and vocational rehabilitation are not available for client placements by SOC categories, administrative steps should be taken to procure that information.

As development of the OIS progresses, the scope of supply data can be systematically expanded. Secondary priority should be given to development of

procedures for utilization of HEGIS data, the Noncollegiate Postsecondary School Survey, and unemployment insurance data to provide added supply coverage.

The OIS should contain both mandatory and discretionary system components. The development of an OIS component to produce demand/supply interface annual reports according to NOICC system requirements specifications should be mandatory for all SOICCs. The annual reports prepared by each SOICC and submitted to NOICC would be the basis of the annual NOICC report to Congress. As indicated, the scope of coverage of the supply elements included should be systematically increased until all relevant data sources supported by Federal funds have been included. Design of OIS components to deal with occupational characteristics and complementary information should be voluntary. The provision of technical assistance in the development of these components, implementation and operations so as to enhance system use and to communicate results to the users should be an ongoing responsibility of NOICC. This responsibility constitutes the more long-range activities and is the object of the next section.

RECOMMENDED LONG-RANGE ACTIVITIES

Long-range activities are divided into two classes for purposes of discussion. The first class consists of those activities that are germane to the improvement of the quality of the demand/supply interface reports. The second class pertains to the leadership and guidance role that NOICC could play in assisting states to develop an augmented OIS to serve their unique needs. Their treatment as separate categories does not imply that NOICC cannot simultaneously engage in activities of both types.

NOICC should undertake responsibility for sponsoring long-term research and development efforts aimed at improving quality of demand and supply estimates. A partial listing of research and development needs, some of which may already be undertaken by NOICC, is as follows:

- development of procedures for the improved collection of job vacancy data, preferably utilizing the OES program mechanism to collect benchmark data;
- development of procedures for the estimation of the contribution to occupational supply provided by private training programs;
- development of procedures for estimating the number of anticipated new entrants and re-entrances into the labor force by demographic characteristics;

- development of procedures for the utilization of net migration data in developing improved estimates of occupational supply;

- development of procedures for the estimation of the contribution of occupational mobility both within and between occupations to supply estimates;

- research to determine relative improvement in predictability accounted for by regional as compared to national models of employment requirements;

- development of improved age, race, sex-specific occupational attrition rates;

- research to determine the relative efficiency and effectiveness of alternative methods for the prediction of state and sub-state employment estimates by industry;

The following recommendations pertain to long-range activities associated with NOICC technical assistance in the development of discretionary system components and in achieving increased system use. To achieve these ends NOICC should consider the development of technical assistance and training packages for SOICC use. These packages should address:

- methods for identifying user needs for occupational characteristics and complementary information;

- methods and means for choosing data elements descriptive of occupational characteristics and occupational characteristics and complementary information for inclusion in an augmented OIS;

- recommended procedures for collecting information on desired characteristics of workers customarily hired, characteristics of typical jobs, employment patterns, and turnover data;

- suggested data elements and procedures for their collection and methods for their inclusion in an OIS pertaining specifically to demographic data, labor force statistics, economic indicators and information descriptive of currently available education and training programs;

- suggested procedures for alternative organizational means of involving a wider constituency of user representatives in the planning and implementation of OIS;

- workshop training materials for SOICCs use in increasing local awareness and interest in OIS activities;

- new and innovative graphic and other visual presentation means for SOICC use in the incorporation of more innovative output formats;

- identification of potentially new and emerging occupations and inform SOICCs of their developing potential;
- changes in commuting patterns resulting from energy conservation;
- suggested uses for occupational data for improved program planning and operations;
- national studies on changing occupational trends and their implications for skills development programs should be commissioned and the results disseminated to the SOICCs;
- SOICCs should be utilized as an information network to gather data on innovative practices in the use of occupational information and this information made available through NOICC as an information clearinghouse;
- SOICC directors should form a national organization with affiliation with national organizations representing the member agencies of SOICC.

EPILOGUE

The NOICC and asociated SOICC network represents an unprecedented opportunity to link education, rehabilitation, and employment and training into an integrated network for meeting the education and work needs of our society. It is urgent that agencies demonstrate that they indeed can put aside their differences and work constructively toward the achievement of common purposes. If coordination through the development and utilization of a common occupational data base is achieved, then our faith in the efficacy of coordinated human service arrangements is vindicated. If the NOICC/SOICC experiment fails to achieve its intended results, then we are doomed to a gloomy and divisive future where agency prerogatives takes precedence over human service. It is to the success of the NOICC/SOICC venture that this paper is dedicated.

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